

**TECHNICAL SYSTEMS AUDIT (TSA) OF THE
CITY OF PHILADELPHIA, DEPARTMENT OF PUBLIC HEALTH, AIR
MANAGEMENT SERVICES LABORATORY (AMSL)
2019**

Conducted by US EPA Region 3
Air & Radiation Division
Air Quality Analysis Branch

October 2019

TABLE OF CONTENTS

| SECTION | PAGE |
|-----------------------|-------------|
| 1.0 EXECUTIVE SUMMARY | 4 |
| 2.0 INTRODUCTION | 5 |
| 3.0 TSA FINDINGS | 8 |

FIGURES

| | |
|---|---|
| FIGURE 1: AMSL AIR MONITORING NETWORK MAP | 5 |
| FIGURE 2: AMSL ORGANIZATIONAL MAP | 7 |

LIST OF TABLES

| | |
|--|---|
| TABLE 1: ANALYTICAL SUPPORT PROVIDED BY AMSL | 5 |
| TABLE 2: ANALYTICAL SUPPORT RECIEVED BY AMSL | 6 |
| TABLE 3: TSA PARTICIPANTS | 6 |

| | |
|---|--|
| APPENDIX A US EPA REGION 3 AUDIT FINDINGS SUMMARY WITH AMSL'S RESPONSES | |
|---|--|

ACRONYMS

| | |
|-------------------|--|
| AMSL | Air Management Services Laboratory |
| AQS | Air Quality System |
| CFR | code of federal regulations |
| CO | carbon monoxide |
| COC | chain of custody |
| FAB | Monitoring site located at 3 rd and Spring Garden Sts. |
| HAP | hazardous air pollutants |
| LAB | Laboratory site located at 1501 E. Lycoming St. |
| MON | Montgomery site located at I-76 & Montgomery Drive |
| NAAQS | National Ambient Air Quality Standards |
| NCore | National Core Network |
| NEA | Northeast Airport site located at Grant Ave & Ashton Rd. |
| NEW | Northeast Waste site located at 2861 Lewis St. |
| NIST | National Institute of Standards and Technology |
| NO | nitrogen oxide |
| NO ₂ | nitrogen dioxide |
| NO _x | oxides of nitrogen (the sum of NO ₂ and NO concentrations) |
| NO _y | total reactive nitrogen oxides |
| O ₃ | ozone |
| PAMS | Photochemical Assessment Monitoring Stations |
| PM ₁₀ | particulate matter less than 10 microns in diameter |
| PM _{2.5} | particulate matter less than 2.5 microns in diameter |
| PQAO | primary quality assurance organization |
| QA/QC | quality assurance and quality control |
| QAPP | quality assurance project plan |
| R3 | EPA Region 3 |
| RIT | Ritner site located at 24th & Ritner Sts. |
| ROX | Roxborough site located at Eva & Dearnley Sts. |
| SLAMS | state and local monitoring stations |
| SO ₂ | sulfur dioxide |
| SWA | Southwest Water Control site located at 8200 Enterprise Ave. |
| TAD | Technical Assistance Document |
| TO-11 | Determination of Formaldehyde in Ambient Air Using Adsorbent Cartridge Followed by High Performance Liquid Chromatography |
| TO-12 | Non-methane organic compounds analyzed by Flame Ionization Detection Volatile organic compounds analyzed by Gas Chromatography/Mass |
| TO-15 | Spectrometry (GC/MS) |
| TOR | Torresdale site located at 4901 Grant Ave & James St. |
| TSA | Technical Systems Audit |
| TSP | total suspended particulates |
| U.S. EPA | United States Environmental Protection Agency |
| VGR | Village Green site located at 6th & Arch Sts. |
| VOC | volatile organic compounds |

1.0 EXECUTIVE SUMMARY

This document is a final report on the findings made by the United States Environmental Protection Agency (US EPA), Region 3 Air & Radiation Division, Air Quality Analysis Branch, following a Technical Systems Audit (TSA) for the City of Philadelphia's, Department of Public Health, Air Management Services Laboratory (AMSL) ambient air monitoring program in accordance to 40 CFR 58 Appendix A Section 2.5:

"Technical systems audits of each PQAO shall be conducted at least every 3 years by the appropriate EPA Regional Office and reported to the AQS."

A TSA is an on-site review and inspection of a state or local agency's ambient air monitoring program to assess its compliance with established regulations governing the collection, analysis, validation, and reporting of ambient air quality data. It includes (but is not limited to) on-site interviews with key program personnel, evaluations of ambient air monitoring sites operated by the state or local, laboratory inspections and a review of quality assurance and data processing procedures.

Region 3's TSA primarily focused on AMSL's: network management, facilities, quality assurance/quality control, data management, and field and laboratory operations. Region 3 (R3) identified 9 findings and several observations. All findings are discussed in detail with recommendations and corrective actions in Section 3 of this report. Details of the status of each audit finding are addressed in a separate document (see Corrective Action Plan for AMSL). The most significant findings are:

- Meteorological equipment not verified/calibrated
- Inlets < 1 meter from side or roof of shelter
- Monitors < 2 meters from obstructions

This TSA showed a marked improvement in AMSL's quality system and practices from the previous TSAs in 2016 and 2017. In general, R3 found that AMSL operates and maintains a satisfactory ambient air monitoring program. AMSL is providing excellent cooperation with R3 staff in supporting the common goal to protect human health and the environment by monitoring criteria air pollutants. R3 greatly appreciates the efforts made by AMSL to make the 2019 TSA a success.

2.0 INTRODUCTION

Air Management Services Laboratory is a division of the City of Philadelphia, Department of Public Health. AMSL operates an air monitoring network consisting of 10 sites (Figure 1) that monitor and sample for criteria pollutants [Carbon Monoxide (CO), Ozone (O₃), Nitrogen Dioxide (NO₂), and Particulate Matter (PM_{2.5}, and PM₁₀), and Sulfur Dioxide (SO₂)], total reactive nitrogen oxides (NO_y), Meteorology, PM Coarse and Speciated PM_{2.5}, carbonyls, volatile organic compounds (VOCs), and HAP metals. AMSL's air monitoring network sites are designated as State and Local Air Monitoring Stations (SLAMS), National Core (NCore), Photochemical Assessment Monitoring Stations (PAMS), and Special Purpose Monitors.

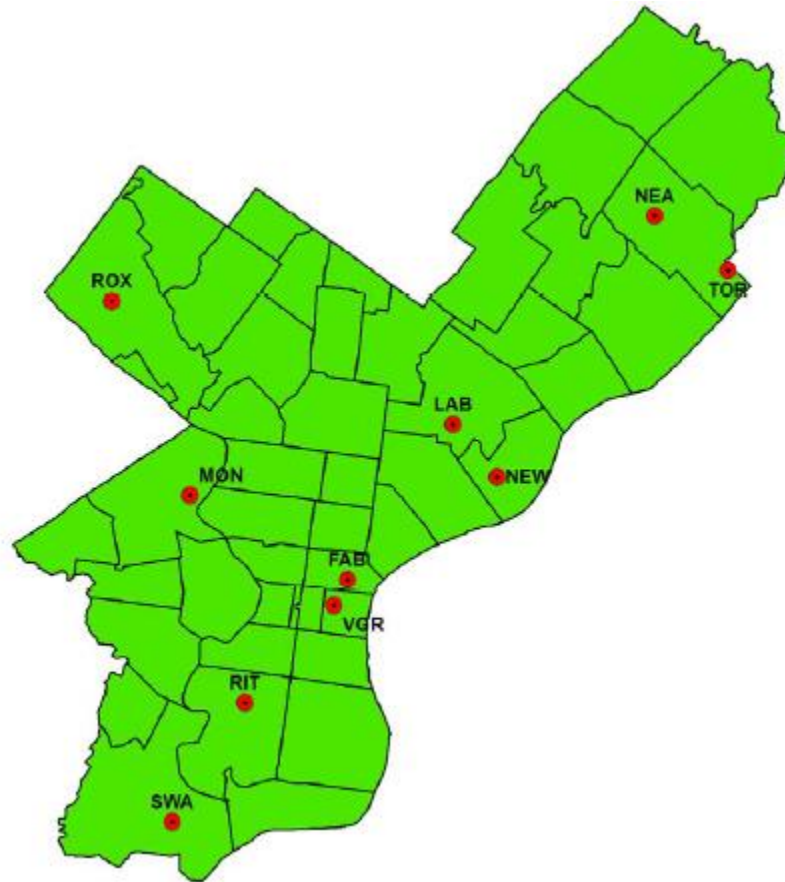


FIGURE 1: AMSL AIR MONITORING NETWORK MAP (2019-2020 AIR MONITORING NETWORK PLAN)

AMSL provides and receives laboratory analytical support (see Tables 1 and 2).

TABLE 1: ANALYTICAL SUPPORT PROVIDED BY AMSL

| ANALYSIS METHOD | RECIEPIENT LABORATORIES |
|---|--|
| Carbonyls (Method TO-11) | Allegheny County Health Department D.C. District Department of the Environment West Virginia DEP Philadelphia Air Management Services |
| Toxics TO-15 (GC-MS) | Philadelphia Air Management Services |
| PAMS TO-12 (GC-FID) | Philadelphia Air Management Services |
| PM (PM _{2.5} , PM _{10-2.5} , PM ₁₀ , TSP) Gravimetric | Philadelphia Air Management Services D.C. Department of Energy & Environment |

TABLE 2: ANALYTICAL SUPPORT RECEIVED BY AMSL

| LABORATORY | POLLUTANTS ANALYZED |
|---|---------------------------------------|
| US EPA National Contract Lab Research Triangle Park, NC 27711 | PM _{2.5} Chemical Speciation |
| West Virginia Department of Environmental Protection / Division of Air Quality 255 Gus R. Douglass Lane Charleston, WV 25312 | ICP-MS Metals |

R3 auditors (Verena Joerger, Kia Long, Elizabeth Gaige, and Sara Calcinore) conducted the TSA during August 13-15, 2019. R3 auditors conducted field site and laboratory evaluations, reviewed QA/QC documentation and practices, and met with AMSL staff to discuss improvements and preliminary findings. Table 2 lists AMSL and R3 audit participants.

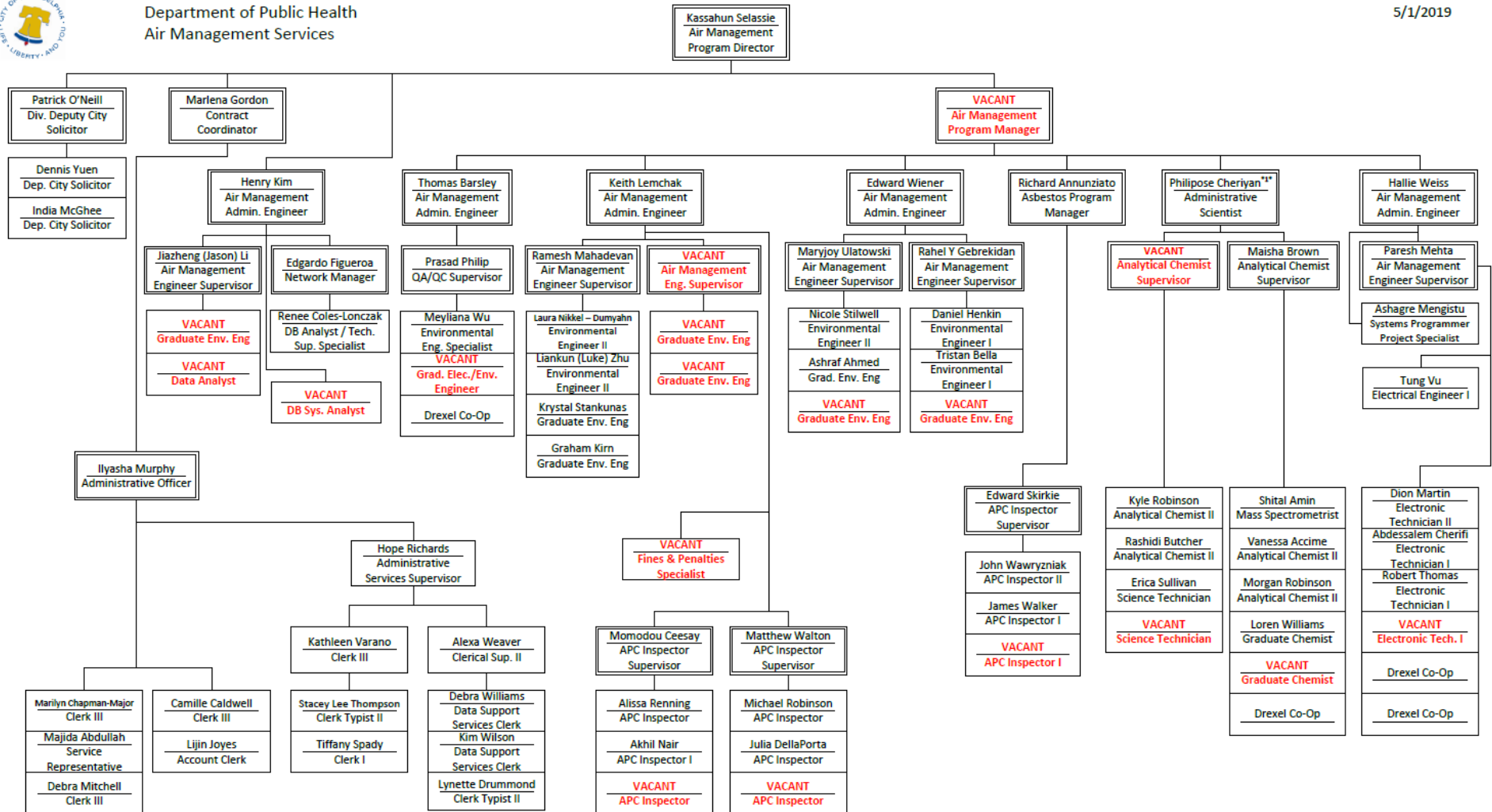
TABLE 3: TSA PARTICIPANTS

| AIR MANAGEMENT SERVICES LABORATORY | |
|---|--|
| NAME | POSITION |
| Hallie Weiss | Ambient Air Monitoring Network Manager |
| Thomas Barsley | Air Management Admin. Engineer |
| Paresh Mehta | Field Operations Supervisor |
| Philipose Cherian | Laboratory Supervisor |
| Prasad Philip | QA/QC Supervisor |
| Maisha Brown | Analytical Chemistry Supervisor |
| Meyliana Wu | Quality Assurance |
| Erica Sullivan | Science Technician |
| Rashidi Butcher | Analytical Chemist II |
| Shital Amin | Mass Spectrometrists |
| Kyle Robinson | Analytical Chemist II |
| Vanessa Accime | Analytical Chemist II |
| Morgan Robinson | Analytical Chemist II |
| Dion Martin | Electronic Technician II |
| Adessalem Cherifi | Electronic Technician I |
| Robert Thomas | Electronic Technician I |
| Nishant Shah | Electronic Technician I |
| Loren Williams | Chemist |
| EPA REGION 3 AUDITORS | |
| Kia Long | Physical Scientist |
| Elizabeth Gaige | Physical Scientist |
| Verena Joerger | Physical Scientist |
| Sara Calcinore | Life Scientist |



Department of Public Health
Air Management Services

5/1/2019



DROP DATE(S)
1. P. Cheriyan - 1/3/2020

FIGURE 2: AMSL ORGANIZATIONAL CHART

3.0 TSA FINDINGS

This section summarizes the audit findings made by the EPA Region 3 audit team. In August 2019, R3 sent an audit findings summary to AMSL for their review. AMSL responded to the findings summary and those comments are found in Appendix A of this report. R3 found issues in the areas of the laboratory, quality assurance/quality control and field operations.

TSA findings are categorized and defined as:

| | |
|--------------------|---|
| MAJOR | Nonconformance of high importance which is unacceptable and must be remedied. Such nonconformances impact data quality, indicate unacceptable procedures are in use (per guidance documents and regulations), endanger staff members, and/or obscure the traceability of data. |
| MINOR | Nonconformance of somewhat lesser importance as compared to a major finding, but one that should be remedied. Such nonconformances have marginal impact on data quality. Action taken to address such nonconformances will yield improvements in data quality and/or bring procedures into full compliance with guidance documents and/or quality system standards. |
| OBSERVATION | Either a nonconformance with no impact to data quality or a recommendation for an improvement or best practice. |

Quality Assurance/Quality Control (QA/QC)

Finding QA-1: Meteorological equipment not verified/calibrated

Finding Type: MAJOR

Discussion: Meteorological equipment is not being serviced, verified, or calibrated. All meteorological equipment must be routinely verified/calibrated. The requirements differ depending on the classification of the site. See QA Handbook Vol. 4, Section 0 for tables outlining specific requirements.

Recommendation/Corrective Action: Implement protocol for servicing, verifying, and calibrating meteorological equipment. If the capability exists internally, the equipment can be verified and calibrated in-house. Otherwise, consider sending the equipment back to the manufacturer for servicing.

AMSL Response: 1) Added QA Handbook Volume 4 to AMS Intranet. Read. 2) NEW – service and calibrate annually with Vaisala with spare configured. TOR/MON – not 10 meters – flag operational deviation and put the height or do not report but keep for internal records. EPA – do we still need to service and calibrate annually with Vaisala for TOR and MON?

Finding QA-2: COC forms do not contain space for recording sample receipt temperature and receipt signature/initial

Finding Type: MINOR

Discussion: The COC forms for both carbonyls and PM_{2.5} do not have a space for laboratory analysts to record the date/time/temperature of samples upon receipt/unpacking. See 5.8.1.4 of the PAMS TAD for Carbonyls sample COC requirements

Recommendation/Corrective Action: The COC forms for carbonyls and PM_{2.5} should be amended to include the date/time/temperature as well as a place for the analyst to sign off or initial that they have recorded the temperature and unpacked the samples.

AMSL Response: 1) Carbonyls – MB added date, time, cooler temperature, and analysts signature upon receipt and unpacking like Appendix C of National PAMS QAPP COC. Will provide attachment shortly. EPA – can you also provide Carbonyl COC examples from other state/locals as mentioned during the 8/15 TSA Wrap-up? 2) PM_{2.5} – PM added date, time, temperature, and technician signature to COC at refrigerator pick-up, added date, time, cooler temperature, and technician signature to COC at refrigerator drop-off and added date, time, temperature, and analyst signature upon receipt and unpacking. See attachment.

Finding QA-3: Only one person able to run data validation program

Finding Type: OBSERVATION

Discussion: Only one person is trained in how to run the data validation program using the MTL software for PM_{2.5} data. Relying on one person to run a program is not desirable as that person could be absent for an extended period of time and leave the QA group without this data validation capability.

Recommendation/Corrective Action: Train at least one other person in the QA group to run the MTL data validation program and serve as back-up in case the primary operator of that program is not available.

AMSL Response: This finding is incorrectly stated. Ed Braun wrote a program to upload the temperature and relative humidity values from the Weighing Room computer to our Oracle database. This is not actually connected to MTL software nor affect data validation associated with it. These values can be used to calculate the average and SD values of weighing room temperature and relative humidity values during the previous 24 hours of weighings. But even without uploading these values to Oracle database, these are available through the MTL software directly, which is available to multiple personnel – Philipose, Meyliana, and Analyst.

Laboratory (LAB)

Finding LAB-1: Laboratory refrigerator thermometers are not certified or replaced annually.

Finding Type: MINOR

Discussion: The refrigerators located in the AMS lab where PM_{2.5} and carbonyls samples are stored, do not have certified thermometers. These samples must be stored at <4°C (Quality Assurance Document 2.12), but this cannot be assured unless the thermometers have been verified.

Recommendation/Corrective Action: Institute a practice of verifying or replacing the laboratory refrigerator thermometers on an annual basis.

AMSL Response: *Thermometers are placed in each refrigerator and freezer and will be replaced and ordered annually.*

Field Site Evaluation (FSE)

Finding FSE-1: Inlets < 1 meter from side of shelter, or roof of shelter.



Finding Type: MAJOR

Discussion: The LAB site's O₃ inlet was less than 1 meter away from the supporting structure. The sampling lines were hanging off the side of the shelter in close proximity to the wall and exhaust line. It was also observed that the sample lines were without rain guards. Generally, a probe or monitoring path located near or along a vertical wall is undesirable because air moving along the wall may be subject to

possible removal mechanisms. In addition, the SWA and TOR inlets were < 1 meter from the roofs of the shelters. *"The probe or at least 90 percent of the monitoring path must be at least 1 meter vertically and horizontally away from any supporting structure, walls, parapets, penthouses, etc."* 40 CFR part 58 Appendix E Section 2.

Recommendation/Corrective Action: Adjust the sampling line inlet to meet Appendix E siting criteria and be away from the exhaust line. Flag past data with "SX" AQS flag for not meeting siting criteria.

AMSL Response: 1) LAB O3 – Line put back through the roof with rain guard at least 1 meter away from the exhaust line – see picture; Flag data back to date with SX AQS flag until 8/16/19. Start 4/1/19. 2) SWA – to work on placing at least 1 meter from the roof of the shelter (tubing). 3) TOR – inlet is at least 1 meter from the roof of the shelter – see picture

Finding FSE-2: Monitors < 2 meters from obstruction



Finding Type: MAJOR

Discussion: A TSP (S/N 2317) is less than 2 meters from a building at MON, and the URG and MetOne SASS at RIT are < 2 meters from the side of the shelter. The horizontal and vertical distance from supporting structures to probe, inlet or 90% of monitoring path must be > 2 meters. 40 CFR Appendix E, Table E-4.

Recommendation/Corrective Action: For MON, verify the distance from the TSP to the wall of the neighboring building. If the distance is < 2 meters, adjust the TSP monitor's location to meet Appendix E siting criteria. For RIT, adjust the monitor locations so that they are at least 2 meters from the monitoring shelter. Flag past data with "SX" in AQS for data collected when the monitor did not meet siting criteria.

AMSL Response: 1) MON – Adjusted TSP Monitor (BaP) location to meet 2 meter distance criteria – see picture. 2) RIT – Follow PM2.5 with 2 meters criteria. Plan to move fence in Spring 2020 with PWD stormwater project – they will let us know dates of construction, of request a waiver.

Finding FSE-3: Station temperature not logged / no station temperature sensor

Finding Type: MINOR

Discussion: The internal station temperature at ROX is not being logged or monitored. The station operator is relying on a uncertified thermostat next to the A/C unit to read station temperature.

"Analyzers must be operated within the range for which they were designated, in order for the data produced by the analyzers to be considered FRM/FEM." QA Handbook Vol. II, Section 7.0. Without a reliable temperature sensor and data logger, the internal temperature of these sites is not being properly monitored.

Recommendation/Corrective Action: Install a data logger and temperature sensor (such as those located at other AMS sites). If that is not feasible, maintain a certified thermometer near the instrumentation and have the station operator record the station temperature in the site log book.

AMSL Response: Hand-held thermometer placed next to instruments (see picture) and will be replaced and ordered annually. Technician to check temperature and put in e-logbook weekly.

Finding FSE-4: Tree driplines within 10 meters of sample inlets



Finding Type: MINOR

Discussion: The driplines of nearby trees were < 10 meters from the sampling inlets at ROX and SWA. While these are not criteria pollutant sites, it is still best practice to maintain a distance of > 20 meters from the dripline of trees, and at least 10 meters. *"Trees can provide surfaces for SO₂, O₃, or NO₂ adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where trees are of sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path."* 40 CFR Part 58 Appendix E, Section 5.

Recommendation/Corrective Action: 1) Trim the tree driplines so that they are below the inlets, or back so they are beyond 10 meters from the sampling inlets.

Or, 2) Flag the data to indicate that the site does not meet siting criteria with the "SX" AQS code.

AMSL Response: 1) ROX – Work on getting contact – 2) SWA – Contact to trim trees annually – Eduardo Bourges – see picture. Flag data back to date with SX AQS flag – Jan. 1 to Sept. 5, 2019

Finding FSE-5: Sonic anemometers sited below 10 meters.



Finding Type: MINOR

Discussion: The sonic anemometers at TOR and MON are sited below 10 meters from the ground. This instrumentation should be placed 10 meters above ground level and at a distance of 10 times the height of obstructions in order to prevent interferences. (QA Handbook Vol. 4, Section 0. Table 0.12).

Recommendation/Corrective Action: Meteorological measurements are strongly encouraged at near-road sites, therefore, the TOR and MON sonic anemometers should be moved to a height of 10 meters above ground level. If that is not possible, data should be flagged to indicate a deviation in siting criteria ("SX") and a note should be added to AQS that describes the height of the meteorological equipment.

AMSL Response: *TOR/MON – not 10 meters – flag SX in AQS and put the height or do not report but keep for internal records – EPA – do we still need to service and calibrate annually with Vaisala? Same question as in Finding QA-1.*

Finding FSE-6: Dirty sample inlet lines



Finding Type: MINOR

Discussion: The O₃ sample inlet lines at NEA contained dirt and a light blue coloration. Visible dirt should not be allowed to accumulate in sample lines as it can disrupt sample flow and scavenge pollutants. Sample lines should be cleaned or replaced minimally on an annual basis. However, some sites may require more frequent cleaning or replacement.

Recommendation/Corrective Action: Increase sample inlet line cleaning/replacement frequency.

AMSL Response: Check quarterly and clean/replace semi-annually or as needed. Note in e-logbook.

Finding FSE-7: Shelter water damage



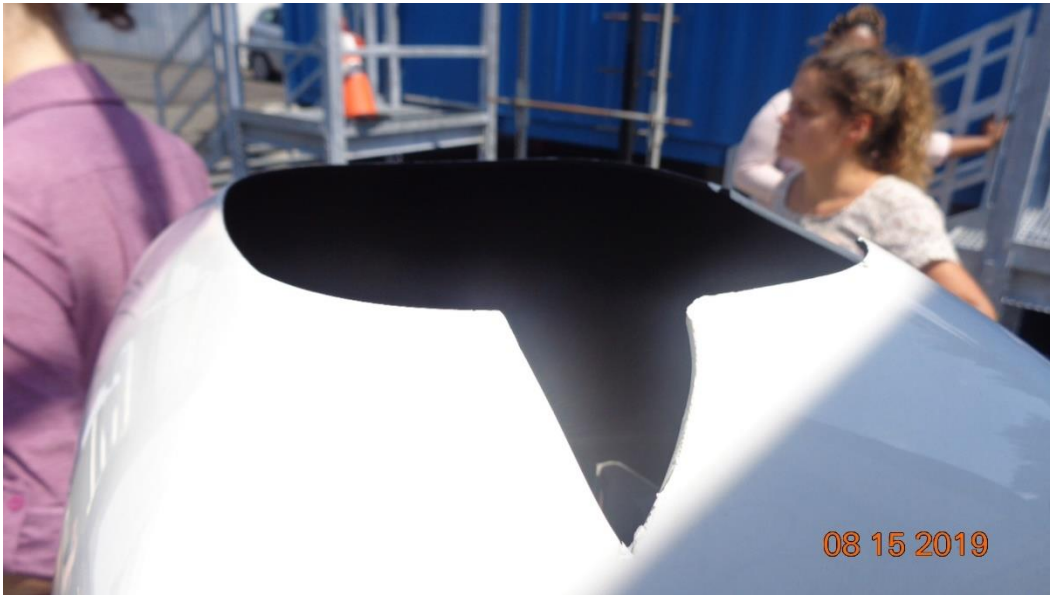
Finding Type: OBSERVATION

Discussion: There is water damage in the wall panels near the A/C unit at NEA. In addition, there is a gap between the A/C unit and the wall of the shelter. Evidence of water or condensation in shelters should be taken seriously, as water can lead to damage of instrumentation and loss of data.

Recommendation/Corrective Action: Repair or replace the shelter. The gap between the wall and the A/C unit should be stuffed with an insulating material, or appropriately covered to prevent outside air and water from entering the shelter, and the cause of the water damage in the wall should be identified and remedied.

AMSL Response: *See if Health Facilities can repair or recommend next steps.*

Finding FSE-8: Ceilometer damaged



Finding Type: OBSERVATION

Discussion: The protective shield on the ceilometer is damaged, potentially exposing the aperture to interferences and making it vulnerable to damage.

Recommendation/Corrective Action: Verify that the ceilometer is functioning properly post-damage. Contact Vaisala and acquire a replacement shield.

AMSL Response: In process of ordering Vaisala replacement.

APPENDIX A

US EPA REGION 3 AUDIT FINDINGS SUMMARY WITH AMSL'S RESPONSES

AMS (Air Management Services Laboratory) TSA 2019 Finding Summary

QUALITY ASSURANCE (QA)

| FINDING No. | Finding Type | Program Area | FINDING | DISCUSSION | CORRECTIVE ACTION / RECOMMENDATION | AMS Comments |
|-------------|--------------|-----------------------------------|---|---|--|---|
| QA-1 | MAJOR | Meteorology | Meteorological equipment not verified/calibrated | Meteorological equipment is not being serviced, verified, or calibrated. All meteorological equipment must be routinely verified/calibrated. The requirements differ depending on the classification of the site. See QA Handbook Vol. 4, Section 0 for tables outlining specific requirements. | Implement protocol for servicing, verifying, and calibrating meteorological equipment. If the capability exists internally, the equipment can be verified and calibrated in-house. Otherwise, consider sending the equipment back to the manufacturer for servicing. | 1) Added QA Handbook Volume 4 to AMS Intranet. Read. 2) NEW - service and calibrate annually with Vaisala with spare configured. TOR/MON - not 10 meters - flag operational deviation and put the height or do not report but keep for internal records. EPA - do we still need to service and calibrate annually with Vaisala for TOR and MON? |
| QA-2 | MINOR | Laboratory Chain of Custody (COC) | COC forms do not contain space for recording sample receipt temperature and receipt signature/initial | The COC forms for both carbonyls and PM _{2.5} do not have a space for laboratory analysts to record the date/time/temperature of samples upon receipt/unpacking. See 5.8.1.4 of the PAMS TAD for Carbonyls sample COC requirements. | The COC forms for carbonyls and PM _{2.5} should be amended to include the date/time/temperature as well as a place for the analyst to sign off or initial that they have recorded the temperature and unpacked the samples. | 1) Carbonyls - MB added date, time, cooler temperature, and analyst signature upon receipt and unpacking like Appendix C of National PAMS QAPP COC. Will provide attachment shortly. EPA - can you also provide Carbonyl COC examples from other state/locals as mentioned during the 8/15 TSA Wrap-up? 2) PM2.5 - PM added date, time, temperature, and technician signature to COC at refrigerator pick-up, added date, time, cooler temperature, and technician signature to COC at refrigerator drop-off and added date, time, temperature, and analyst signature upon receipt and unpacking. See attachment. |
| QA-3 | OBSERVATION | PM _{2.5} Data Validation | Only one person able to run data validation program | Only one person is trained in how to run the data validation program using the MTL software for PM _{2.5} data. Relying on one person to run a program is not desirable as that person could be absent for an extended period of time and leave the QA group without this data validation capability. | Train at least one other person in the QA group to run the MTL data validation program and serve as back-up in case the primary operator of that program is not available. | This finding is incorrectly stated. Ed Braun wrote a program to upload the temperature and relative humidity values from the Weighing Room computer to our Oracle database. This is not actually connected to MTL software nor affect data validation associated with it. These values can be used to calculate the average and SD values of weighing room temperature and relative humidity values during the previous 24 hours of weighings. but, even without uploading these values to Oracle database, these are available through the MTL software directly, which is available to multiple personnel - Philipose, Meyliana, and Analyst. |

LABORATORY (LAB)

| FINDING No. | Finding Type | SITE | PROGRAM | FINDING | DISCUSSION | CORRECTIVE ACTION / RECOMMENDATION | AMS Comments |
|-------------|--------------|---------|------------------|---|--|---|---|
| LAB-1 | MINOR | AMS Lab | PM and Carbonyls | Laboratory refrigerator thermometers are not certified or replaced annually | The refrigerators located in the AMS lab where PM _{2.5} and carbonyls samples are stored, do not have certified thermometers. These samples must be stored at < 4°C (Quality Assurance Document 2.12), but this cannot be assured unless the thermometers have been verified. | Institute a practice of verifying or replacing the laboratory refrigerator thermometers on an annual basis. | Thermometers are placed in each refrigerator and freezer and will be replaced and ordered annually. |

| FIELD SITE EVALUATIONS (FSE) | | | | | | | |
|------------------------------|--------------|---------------|---------------------------------------|--|---|---|---|
| FINDING No. | Finding Type | SITE | AIRS CODE | FINDING | DISCUSSION | CORRECTIVE ACTION / RECOMMENDATION | AMS Comments |
| FSE-1 | MAJOR | LAB, SWA, TOR | 42-101-0004, 42-101-0063, 42-101-0075 | Inlets < 1 meter from side of shelter, or roof of shelter | The LAB site's O ₃ inlet was less than 1 meter away from the supporting structure. The sampling lines were hanging off the side of the shelter in close proximity to the wall and exhaust line. It was also observed that the sample lines were without rain guards. Generally, a probe or monitoring path located near or along a vertical wall is undesirable because air moving along the wall may be subject to possible removal mechanisms. In addition, the SWA and TOR inlets were < 1 meter from the roofs of the shelters. <i>"The probe or at least 90 percent of the monitoring path must be at least 1 meter vertically and horizontally away from any supporting structure, walls, parapets, penthouses, etc." 40 CFR part 58 Appendix E Section 2.</i> | Adjust the sampling line inlet to meet Appendix E siting criteria and be away from the exhaust line. Flag past data with "SX" AQS flag for not meeting siting criteria. | 1) LAB O3 - Line put back through the roof with rain guard with inlet at least 1 meter away from the building and away from the exhaust line - see picture ; Flag data back to date with SX AQS flag until 8/16/19. Start 4/1/19. 2) SWA - to work on placing at least 1 meter from the roof of the shelter (tubing). 3) TOR - inlet is at least 1 meter from the roof of the shelter - see picture |
| FSE-2 | MAJOR | MON, RIT | 42-101-0076, 42-101-0055 | Monitors < 2 meters from obstruction | A TSP (SIN 2317) is less than 2 meters from a building at MON, and the URG and MetOne SASS at RIT are < 2 meters from the side of the shelter. The horizontal and vertical distance from supporting structures to probe, inlet or 90% of monitoring path must be > 2 meters. 40 CFR Appendix E, Table E-4. | For MON, verify the distance from the TSP to the wall of the neighboring building. If the distance is < 2 meters, adjust the TSP monitor's location to meet Appendix E siting criteria. For RIT, adjust the monitor locations so that they are at least 2 meters from the monitoring shelter. Flag past data with "SX" in AQS for data collected when the monitor did not meet siting criteria. | 1) MON - Adjusted TSP Monitor (BaP) location to meet 2 meter distance criteria - see picture . 2) RIT - Follow PM2.5 with 2 meters criteria. Plan to move fence in Spring 2020 with PWD stormwater project - they will let us know dates of construction, or request a waiver. |
| FSE-3 | MINOR | ROX | 42-101-0048 | Station temperature not logged / no station temperature sensor | The internal station temperature at ROX is not being logged or monitored. The station operator is relying on an uncertified thermostat next to the A/C unit to read the station temperature. <i>"Analyzers must be operated within the range for which they were designed, in order for the data produced by the analyzers to be considered FRM/FEM." QA Handbook Vol. II, Section 7.0.</i> Without a reliable temperature sensor and data logger, the internal temperature of these sites is not being properly monitored. | Install a data logger and temperature sensor (such as those located at other AMS sites). If that is not feasible, maintain a certified thermometer near the instrumentation and have the station operator record the station temperature in the site log book. | Hand-held thermometer placed next to instruments (see picture) and will be replaced and ordered annually. Technician to check temp and put in e-logbook weekly. |
| FSE-4 | MINOR | ROX, SWA | 42-101-0048, 42-101-0063 | Tree driplines within 10 meters of sample inlets | The driplines of nearby trees were < 10 meters from the sampling inlets at ROX and SWA. While these are not criteria pollutant sites, it is still best practice to maintain a distance of > 20 meters from the dripline of trees, and at least 10 meters. <i>"Trees can provide surfaces for SO₂, O₃, or NO₂ adsorption or reactions, and surfaces for particle deposition. Trees can also act as obstructions in cases where they are located between the air pollutant sources or source areas and the monitoring site, and where trees are of sufficient height and leaf canopy density to interfere with the normal airflow around the probe, inlet, or monitoring path." 40 CFR Part 58 Appendix E, Section 5.</i> | 1) Trim the tree driplines so that they are below the inlets, or back so they are beyond 10 meters from the sampling inlets. Or, 2) Flag the data to indicate that the site does not meet siting criteria with "SX" AQS code. | 1) ROX - Work on getting contact - 2) SWA - Contact to trim trees annually - Eduardo Borges - see picture . Flag data back to date with SX AQS flag - Jan. 1 to Sept. 5, 2019 |
| FSE-5 | MINOR | TOR, MON | 42-101-0075, 42-101-0076 | Sonic anemometers sited below 10 meters | The sonic anemometers at TOR and MON are sited below 10 meters from the ground. This instrumentation should be placed 10 meters above ground level and at a distance of 10 times the height of obstructions in order to prevent interferences. (QA Handbook Vol. 4, Section 0, Table 0.12). | Meteorological measurements are strongly encouraged at near-road sites, therefore, the TOR and MON sonic anemometers should be moved to a height of 10 meters above ground level. If that is not possible, data should be flagged to indicate a deviation from siting criteria ("SX") and a note should be added to AQS that describes the height of the meteorological equipment. | TOR/MON - not 10 meters - flag SX in AQS and put the height or do not report but keep for internal records - EPA - do we still need to service and calibrate annually with Vaisala? Same question as in Finding QA-1. |
| FSE-6 | MINOR | NEA | 42-101-0024 | Dirty sample inlet lines | The O ₃ sample inlet lines at NEA contained dirt and a light blue coloration. Visible dirt should not be allowed to accumulate in sample lines as it can disrupt sample flow and scavenge pollutants. Sample lines should be cleaned or replaced minimally on an annual basis. However, some sites may require more frequent cleaning or replacement. | Increase sample inlet line cleaning/replacement frequency. | Check quarterly and clean/replace semi-annually or as needed. Note in e-logbook. |
| FSE-7 | OBSERVATION | NEA | 42-101-0024 | Shelter water damage | There is water damage in the wall panels near the A/C unit at NEA. In addition, there is a gap between the A/C unit and the wall of the shelter. Evidence of water or condensation in shelters should be taken seriously, as water can lead to damage of instrumentation and loss of data. | Repair or replace the shelter. The gap between the wall and the A/C unit should be stuffed with an insulating material, or appropriately covered to prevent outside air and water from entering the shelter, and the cause of the water damage in the wall should be identified and remedied. | See if Health Facilities can repair or recommend next steps. |
| FSE-8 | OBSERVATION | NEW | 42-101-0048 | Ceilometer shield damaged | The protective shield on the ceilometer is damaged, potentially exposing the aperture to interferences and making it vulnerable to damage. | Verify that the ceilometer is functioning properly post-damage. Contact Vaisala and acquire a replacement shield. | In process of ordering Vaisala replacement. |